



ROBBINS LANE • SYOSSET, LONG ISLAND, NEW YORK

12 May 1959

Headquarters
United States Air Force
Washington 25, D. C.

Attention: Major Watson

Dear Major Watson:

Reference our verbal discussion the morning of 12 May 1959, I am pleased to enclose prints of the two camera sketches which we discussed.

Fig. 1 shows a 12" focal length, 90° panoramic camera in a very compact configuration. The scan angle, as you will note, has been arbitrarily shown at 90 degrees. It can be greater than this depending upon the window space available.

Fig. 2 shows two of the cameras placed in a convergent arrangement for stereo photography. The half angle shown in Fig. 2 is 19° with 5" film. This means that the picture from the rearward facing camera will completely overlap the picture area which was previously seen by the forward looking camera. If 70 mm. film is used, this half angle can be increased to 24° which will give a stereo capability wherein vertical heights can be measured to approximately the same degree of accuracy as the planimetric dimensions.

The location of the film spools as shown in both sketches is entirely arbitrary. They can be located side by side across the vehicle, in an over and under arrangement, or they can be extended along the flight axis either vertically or horizontally.

For the lightest weight configuration both cameras would be operated by the same drive, use the same supply spool, and be built in an integral structure. If completely independent

25 YEAR RE-REVIEW

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cameras are used to secure redundancy and the increase in reliability that this affords, there is an additional weight penalty of about 20 pounds over the nominal 100 pounds gross weight (including film for a 2000 mile flight; for 4000 mile flight add 15 pounds).

There are three possible lenses for this camera, to wit: the Pacific Optical 12" f:3.8 modified to a resolution of 140 l/mm, the Fecker 12" f:5.6 at 140 l/mm, or a 12" version of the lens used on a current program. The latter lens will permit some reduction--perhaps as much as 2 inches in overall camera height. The use of this lens, however, also will result in some loss of acuity and it is slower. Further, even though this lens is of inherent lightweight structure, the nature of its construction and location of the rear nodal point calls for extra counterbalancing weights.

At the moment I favor the Pacific Optical lens which weighs $5\frac{1}{2}$ pounds for an f:3.8 aperture. This larger opening permits exposures of 1/1000 sec. on S.O. 1213 in good light and 1/500 sec. for most usage in winter. If Kodak goes into coating their higher speed version of S.O. 1213 type emulsion, then shutter speeds up to 1/4000 sec. can be used. These higher shutter speeds materially reduce stability requirements.

Our calculated estimates for stability are as follows:

<u>Stabilization Required</u>			
<u>Roll & Pitch Verticality (per axis)</u>	<u>Max. Permissible Roll & Pitch Rates</u>	<u>Azimuth Ac- curacy to Grd. Track</u>	<u>Max. Permissible Azimuth Rate</u>
$\pm 5^\circ$	12"/sec.	$\pm 3^\circ$	30"/sec.
$\pm 5^\circ$	18"/sec.	$\pm 1^\circ$	30"/sec.

Note: Based on 1/500 sec. exposure.

These stability figures are based on a very conservative permissible value for image degradation. If the Itek formula is used, the figures shown can be opened up to a major degree.

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I will have complete detailed specifications on the camera by 25 May 1959 and will forward them to you. The camera structure will be very rugged due to frame construction of stainless steel spacemetal and will withstand 20G accelerations.

Sincerely,



STAT

Vice President-Technical

FPW:s

Encls.

FAIRCHILD CAMERA - CONFIDENTIAL

Fig. 1A

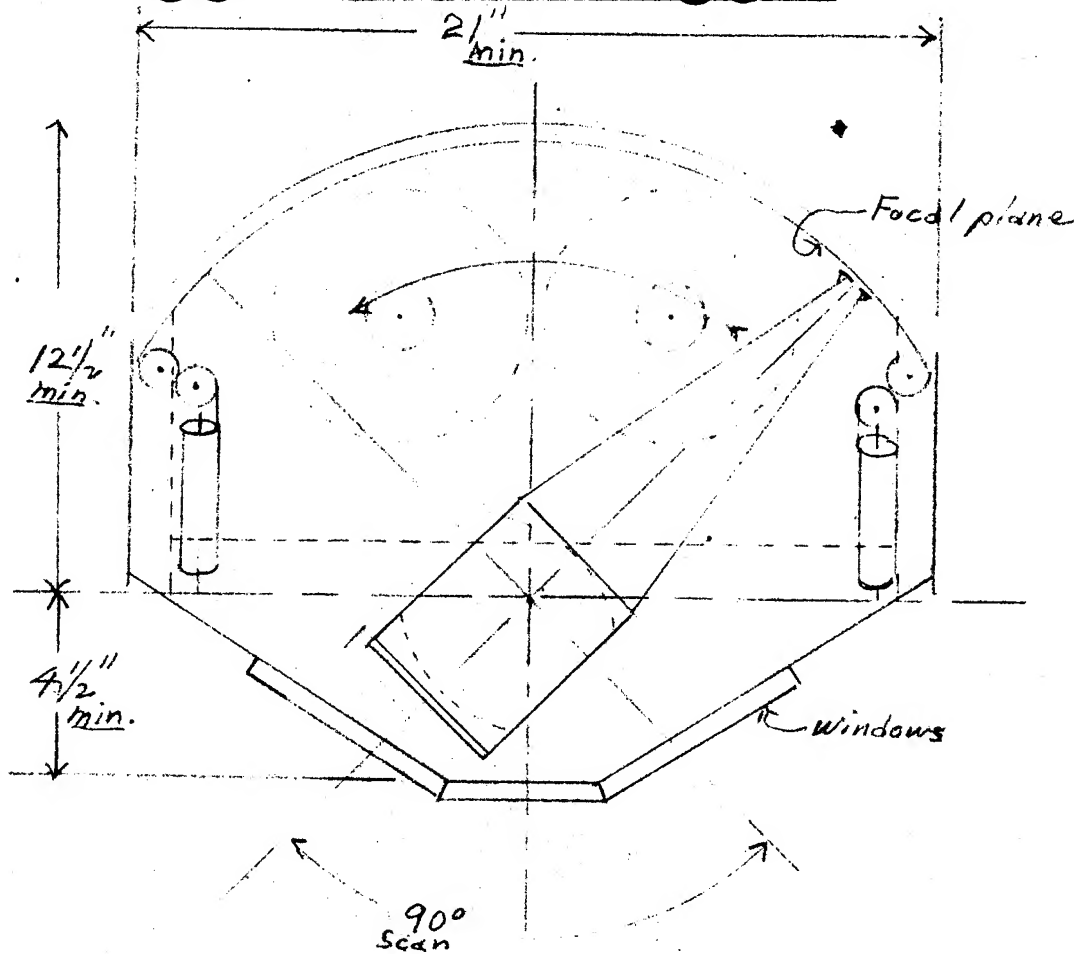
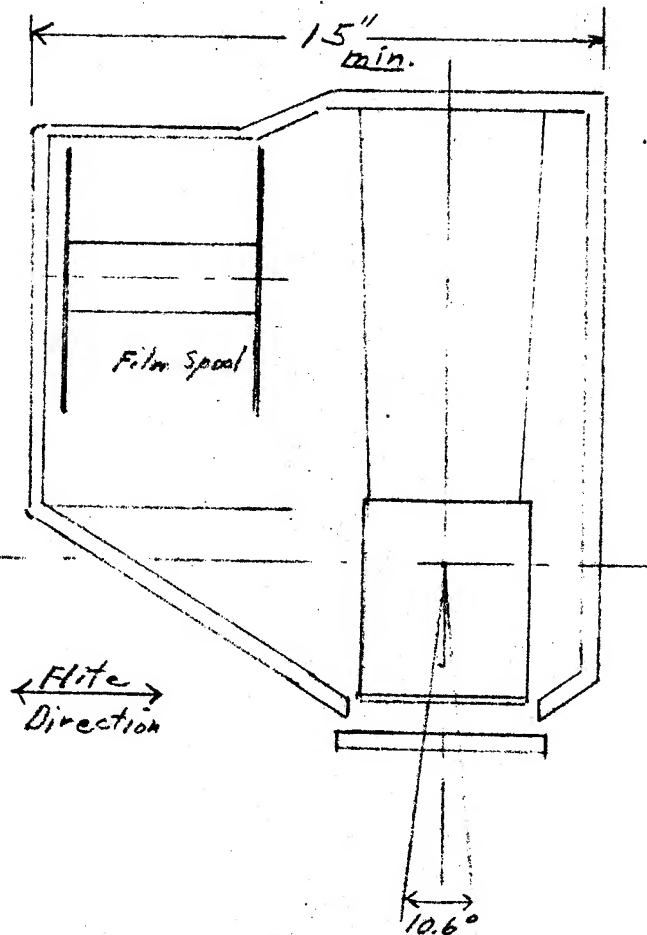


Fig. 1B



Note: Film spools are shown side by side - they can be located over and under or in tandem along flight axis

1/5 Scale

Single Lens
Panoramic

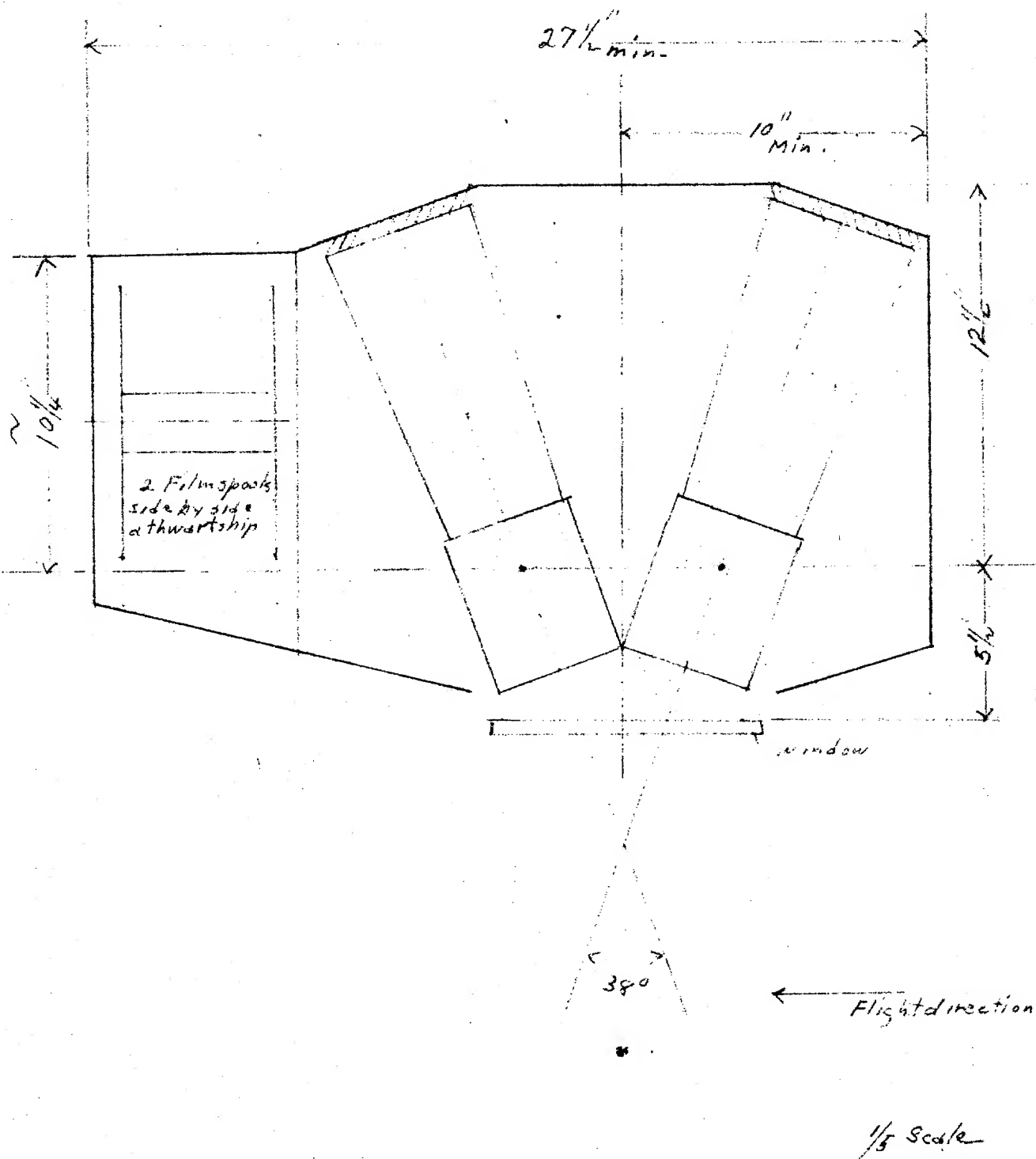
12" f.l. f:3.8

5" film

Exposure 1/1000

Fig. 1

FAIRCHILD CAMERA - CONFIDENTIAL



Twin Lens
Convergent Camera
 (See Fig. 1A for Cross-section)

Fig. 2